CHAPTER 3: FACTORY AND SHOP INSPECTIONS OF EQUIPMENT AND MATERIALS

A. INTRODUCTION

This chapter contains guidance relative to factory and shop inspections of equipment and materials required to be used on merchant vessels. These instructions implement the requirements of 46 CFR 159. Most factory and shop inspections are now conducted by independent laboratories, so assignment of inspectors on a continuing basis is unnecessary. However, periodic visits to manufacturers by Coast Guard inspectors should be made. Manufacturers of approved equipment must grant access to inspectors as a condition of approval.

B. SERVICING OF LIFE RAFTS

1. Carpeting in Service Facilities

Life raft service facilities should be advised against the use of carpeting in their service areas. Carpeting absorbs moisture from the rafts, and is extremely difficult to dry out and disinfect. Fungi that attack rubber-coated fabric rafts may breed in carpeting and damage rafts that are serviced later. Also, carpeting can develop brass fitting contamination, known as "copper oxidation." Although neoprene-coated rafts are not affected by this oxidation, rubber-coated fabric rafts and their metal fittings will be contaminated and deteriorate rapidly. Also, carpeting can lodge small splinters and bits of metal that can puncture and damage rafts.

2. Facilities that Service Foreign Rafts

The Commandant has received numerous requests to inspect U.S. facilities that service foreign rafts. Such requests may be honored by the officer in charge, marine inspection (OCMI), provided that:

a. The facility operators agree to abide by the provisions of 46 CFR 160.051-6 (except for the stamping provisions of 160.051-6(e), which do not apply) and the Annex to the International Maritime Organization (IMO) Resolution A.333(IX). Upon such agreement, the facility's activities shall be spot-checked. Annual reviews shall be made of all such facilities within the OCMI's zone.

b. The facility shall obtain written authorization from raft manufacturers for servicing their products, and shall agree to have the items indicated in Paragraph 1(n) of the IMO Annex.

c. The facility shall maintain servicing records for review by the Coast Guard. It shall also provide to Commandant (G-MOC) an annual summary of deficiencies found on the rafts that were serviced. This survey will allow the Commandant to comply with the requirements of Paragraph 3 of the Annex.

3. Letters of Acceptance

At the completion of a satisfactory evaluation, the OCMI will issue a letter of acceptance to the servicing facility, and forward a copy to Commandant (G-MOC). The Commandant, in turn, will list the facility in Equipment Lists, Commandant Instruction (COMDTINST) M16714.3A, and notify the home Administrations of raft manufacturers that the particular facility has been accepted. Notices of withdrawals will follow the same procedure. The Annex to IMO (formerly IMCO) Resolution A.333(IX) is reprinted in Figure 17-1.

3. Liferaft Hydrostatic Release Testing

The need for the necessity for a Marine Inspector to attend every liferaft servicing has been eliminated. Accordingly, marine inspectors need only witness the testing, and stamp the inspection tag, of hydrostatic release units that are tested concurrently with a "spot check" liferaft servicing attended by an inspector. For testing of those hydrostatic release units not witnessed by a marine inspector, the facility performing the test will stamp its three-digit facility identification code in lieu of the MIO identification letters and "USCG" (46CFR160.62). Facility codes may be found on all recent liferaft servicing approval letters and in COMDTINST M16714.3E (Equipment Lists)

4. Life Raft Inflation Systems

Servicing of Approved Inflatable Liferafts

a. Approved inflatable life rafts must have their inflation systems tested for compliance with 46 CFR 160.051-5(c)(4) and (e)(11) (see NVIC 2-75). These regulations require inflation systems to meet time and temperature range limitations. The method presently used for compliance is pre-charging the carbon dioxide (CO2) inflation cylinder with nitrogen gas to an approximate 10-percent volume. The nitrogen is relatively unaffected by external temperature changes, and acts as a catalyst to release the CO2. Coast Guard approved service facilities must follow the manufacturer's service procedures to pre - charge cylinders. The use of nitrogen to meet this requirement is the industry's standard technique; other methods may be used upon Coast Guard acceptance.

Servicing of Non-Approved Liferafts

b. Servicing of Non-approved Rafts: Servicing of Non-approved Rafts. Uninspected vessels may be equipped with non-approved rafts or rafts that are not serviced at approved facilities. These rafts may not have received a temperature compensation pre-charge at the last servicing. This may result in under inflation or non-inflation when the raft is put into use.

C. PERSONAL FLOTATION DEVICES (PFD'S)

1. Introduction

Life preservers, buoyant vests, cushions, and other PFD's (Type I, II, III, IV, and V) are manufactured in accordance with:

PFD TYPE	CFR APPROVAL CITE
Type I	46 CFR 160.002, 160.005, 160.055
Type II	46 CFR 160.047, 160.052, 160.060
Type III	46 CFR 160.064
Type IV	46 CFR 160.048, 160.049, 160.050
Type V	46 CFR 160.053, 160.077

NOTE: There are some exceptions to type designations. These specifications place an explicit obligation on a manufacturer to inspect all PFD's. Such inspections are intended to maintain the high quality of such products.

2. Life Preservers and Ring Buoys

Type I Devices

a. As of 1 September 1983, the Coast Guard discontinued regular factory inspections of these devices. Regular inspections are conducted by independent testing laboratories such as Underwriters Laboratories, Inc. (UL) and Pittsburgh Testing, Inc. The laboratory inspectors who perform this task are responsible for ensuring that the device meets all applicable specifications and approved plans, and that the manufacturer is performing sufficient tests and has an adequate quality control program. It is the laboratory inspector's responsibility to carry out the procedures in Subchapter Q and the "Guide For Independent Organization Inspection of Type I and Type V PFD's Under Subparts 160.002 and 160.055." This guide was prepared by Commandant (G-MOC) and first issued on 5 August 1983. These procedures help ensure that a manufacturer's devices meet the applicable requirements before they are accepted and marked.

Type IV Devices

b. For Type IV ring buoys approved under 46 CFR 160.050, inspections are also performed by independent laboratories as of 1 September 1983. As with Type I PFD's, the laboratory inspector is responsible for conducting the procedures required by Subchapter Q and the "Guide For Independent Organization Inspection of Type IV PFD's Under Subpart 160.050," which was first issued on 8 August 1983.

Coast Guard Oversight

c. Unannounced Coast Guard inspections should be made at the place of manufacture to ensure that both the manufacturer's quality control and testing laboratory's inspection program are adequate. Such unannounced inspections must be conducted whenever a new approval is granted, and at least quarterly. Additional inspections should be conducted when problems have been discovered during the previous inspection or when the OCMI is notified of problems in the field. When discrepancies are found, immediate action shall be taken to correct them. A report should be submitted to Commandant (G-MOC) noting discrepancies found, corrective actions taken, and recommendations for further action, as appropriate. Communication between the OCMI and the local laboratory inspector(s) will help ensure compliance by the manufacturers.

FIGURE C3-1: IMCO RESOLUTION A.333(IX) ADOPTED ON 12 NOVEMBER 1975 ANNEX RECOMENDATION ON THE CONDITIONS FOR THE APPROVAL OF SERVICING STATIONS FOR INFLATABLE LIFERAFTS

1. Administrations should ensure that periodic survey of inflatable life rafts is performed at servicing stations that have demonstrated competence to service and re-pack rafts, maintain an adequate facility and use only properly trained personnel. Servicing stations, which should have demonstrated this capability for inflatable life rafts of each manufacturer whose rafts they service, should comply with the following:

(a) servicing of inflatable life rafts should be carried out in fully enclosed spaces only. There should be ample room for the number of inflatable life rafts expected to be serviced at any one time; the ceiling should be sufficiently high to overturn, when inflated, the largest life raft to be serviced;

(b) the floor surface should be provided with an easily cleaned coating, sufficiently smooth to ensure that no damage will occur to the life raft fabric;

(c) the servicing space should be well lit provided that direct rays of sunlight do not enter the space;

(d) the temperature and, when necessary, the relative humidity in the servicing space should be sufficiently controlled to ensure that servicing can be effectively carried out;

(e) the servicing space should be efficiently ventilated, but be free from draughts;

(f) separate areas or rooms should be provided for:

(i) life rafts awaiting servicing, repair or delivery;

(ii) the repair of glass fibre containers and painting CO2 cylinders;

(iii) materials or spare parts;

(iv) administrative purposes;

(g) means should be provided in the life raft storage space to ensure that life rafts in containers or valises are not stored in more than two tiers or subjected to excessive loads;

(h) spare and obsolete pyrotechnics should be stored in an approved, safe and secure magazine well away from the servicing and stowage spaces;

(i) sufficient tools should be available for the servicing of life rafts and release gear in accordance with the requirements of the manufacturer, including:

(i) manometers or pressure gauges and thermometers which can be easily read with sufficient accuracy;

(ii) dual purpose air pump(s) for inflating and deflating life rafts, together with the necessary high pressure hoses and adaptors;

(iii) a suitable pair of scales for weighing CO2 cylinders with sufficient accuracy;

(iv) sufficient gas for blowing through the inlet system of the life rafts;

Figure 17-1 — Continued

(j) procedures and arrangements should be made to ensure that a gas cylinder is properly filled and gas-tight before fitting to a life raft;

(k) sufficient materials and accessories should be available for repairing life rafts together with replacements of the emergency equipment;

(l) when servicing davit-launched life rafts adequate means should be provided for overload testing of such life rafts;

(m) servicing and repair work should only be carried out by qualified persons who have been adequately trained to the satisfaction of the Administration. The training procedure should ensure that servicing personnel are made aware of changes and new techniques;

(n) arrangements should be made with the manufacturer to make available:

(i) changes to servicing manuals, servicing bulletins and instructions;

(ii) proper materials and replacement parts;

(iii) bulletins or instructions from the Administration;

(o) smoking should not be allowed in the servicing and packing areas.

2. After initial approval Administrations should arrange for the frequent inspection of servicing stations to ensure that standards are maintained.

3. Each servicing station should prepare and transmit to the Administration, at regular intervals, statistics showing the nature and extent of damages to and defects found in life rafts during servicing and repair work.

Factory Inspections

d. Inspectors making factory visits shall ensure that the PFD's produced comply with the specifications for materials, construction, buoyancy, and workmanship. The independent inspection organization guides referenced above should be followed. In all cases, the inspector shall:

(1) Examine the manufacturer's records of production lot buoyancy tests.

(2) Examine all materials used in the construction. The manufacturer shall show compliance through material affidavits, certified test reports, or tests made in the presence of the inspector.

(3) Examine the component parts and finished items for compliance with applicable drawings, product description, etc.

(4) Examine the markings for proper wording, lot numbers, approval numbers, etc., and test of marking for waterproofness and legibility.

(5) Test the strength and slippage of a body strap assembly. The test must be run at the load specified in the appropriate subpart and must last for 10 minutes, in which time no more than 3 inches of slippage (1 inch for Type I devices) is permitted.

(6) Test the buoyancy of pad inserts. If kapok-filled pad inserts fail the buoyancy test, the buoyancy test for processed kapok under 46 CFR 164.003 shall also be made.

(7) Test the volume displacement of vinyl-covered pad inserts.

(8) Test the seam strength of heat sealed, vinyl-covered pad inserts.

(9) Check the manufacturer's test equipment for calibration within the previous 6 months.

(10) Compare test results with the records of manufacturer tests for correlation.

3. Work Vests

These devices are manufactured in accordance with the requirements of 46 CFR 160.053, which do not require regular factory inspections by the Coast Guard. The OCMI should, however, conduct unannounced inspections at least quarterly, as described above, for manufacturers of work vests in his or her zone.

4. Buoyant Vests, Cushions, and Marine Buoyant Devices

For Type II, III, and IV cushions and some special Type V's, factory inspections are conducted by a recognized laboratory such as UL. However, the specifications provide that unannounced Coast Guard inspections may be made at the place of manufacture at any time. Further, it is the Coast Guard's responsibility to ensure that the testing laboratory's inspection program is adequate. Through at least annual unannounced inspections, OCMI's shall ensure that adequate quality control exists at PFD manufacturers' facilities. When discrepancies are found, immediate action shall be taken to correct them. A report should be submitted to Commandant (G-MOC) noting the discrepancies found, corrective actions taken, and recommendations for further action, as appropriate.

D. IDENTIFICATION AND CERTIFICATION OF ENGINEERING MATERIALS

Under 46 CFR 50.25-1, certain products (e.g., plating, stay bolts, and valves) must be certified by the manufacturer. 46 CFR Table 50.25-1(a) outlines identification and certification requirements for engineering materials. As outlined in 46 CFR 50.15-5 and 50.15-15, certain American Society of Marine Engineers (ASME) and American Society for Testing Materials (ASTM) specifications are adopted for Coast Guard use. The Commandant does not intend to abandon the policy of promoting quality control. Those products listed in 46 CFR Table 50.25-1(a) should be stamped in accordance with the applicable specifications and accompanied by the manufacturer's certification. They may, however, be accepted without such certification, as indicated in 46 CFR 50.25-5. In all cases, the inspector must be satisfied that material presented by the fabricator or repair facility matches that identified in the mill or manufacturer's certificate.

E. BOILERS AND UNFIRED PRESSURE VESSELS

1. PV Markings

Certain ASME certified pressure vessels are accepted by the Coast Guard without Coast Guard shop inspection. However, stamping with the Coast Guard symbol in accordance with 46 C.F.R.50.10—25, 54.10—3, and 54.10-20 is required for all pressure vessels meeting 46 C.F.R. 54.01—5(c)(3) other than those excepted by 46 C.F.R. 54.01—5(c)(4) and 46 C.F.R. 54.01—15(a)(1),(2),(3)&(5). No Marine Safety Office identification letters or serial numbers are required for pressure vessels unless the Coast Guard conducts the shop inspections. The manufacturer's name and serial number provide sufficient identification for these units.

2. Data Reports

Since the Coast Guard requirements applicable to pressure vessels found in 46 C.F.R. Table 54.01—5(b) are in excess of the minimum requirements of the ASME Code, it must not be assumed that ASME authorized inspectors will assure that they have been met. Accordingly, to assure these additional requirements are met, marine inspectors must review the manufacturer's Data Reports. The Coast Guard symbol stamped on the pressure vessel indicates that a marine inspector reviewed the Data Reports and that the pressure vessel meets Coast Guard regulations.

3. Shop Inspections

Complete marking with the Coast Guard symbol and serial number is required for all pressure vessels receiving Coast Guard shop inspection whether or not an ASME stamp is applied. This marking will be applied by the marine inspector performing the shop inspection. When the Coast Guard conducts shop inspection of pressure vessels the marine inspector will also sign the Data Reports to indicate compliance with Coast Guard regulations.

> **NOTE:** See MSM II, Section A, Chapter 4 for further information on boiler plan submittal.

F. MARINE SANITATION DEVICES (MSD'S)

Pressure vessel components of these devices are generally exempt from shop inspection and plan approval requirements via 46 CFR 54.01-15(a)(1). Though not generally inspected as pressure vessels, these units are subject to the requirements of 33 CFR 159 (see chapter 18 of this volume).

G. OILY-WATER SEPARATORS

Oily-water separators are nonstandard fluid conditioner fittings. As such, they are not subject to the requirements for shop inspection and stamping of 46 CFR 56.15-1(e). Though not inspected as pressure vessels, such units are subject to the requirements of 46 CFR 162.050.

H. LIFE RAFT INFLATION SYSTEMS

1. Servicing of Approved Inflatable Liferafts

Approved inflatable life rafts must have their inflation systems tested for compliance with 46 CFR 160.051-5(c)(4) and (e)(11) (see NVIC 2-75). These regulations require inflation systems to meet time and temperature range limitations. The method presently used for compliance is precharging the carbon dioxide (CO2) inflation cylinder with nitrogen gas to an approximate 10-percent volume. The nitrogen is relatively unaffected by external temperature changes, and acts as a catalyst to release the CO2. Coast Guard approved service facilities must follow the manufacturer's service procedures to pre -charge cylinders. The use of nitrogen to meet this requirement is the industry's standard technique; other methods may be used upon Coast Guard acceptance.

2. Servicing of Non-Approved Liferafts

Servicing of Non-approved Rafts: Servicing of Non-approved Rafts. Uninspected vessels may be equipped with non-approved rafts or rafts that are not serviced at approved facilities. These rafts may not have received a temperature-compensation precharge at the last servicing. This may result in under inflation or non-inflation when the raft is put into use.